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Claims

[c1] 1.A method of forming a bond pad for use in a wirebond interconnection, comprising:
depositing a first layer of bond pad material on a substrate; and
depositing a second layer of bond pad material on the first layer, wherein the first layer has a higher Young"s Modulous of Elasticity than the second layer.

[c2] 2. The method of claim 1, wherein the first layer comprises a material selected from the group consisting of: $TiAl_x$, an aluminum alloy having at least 2% titanium, an aluminum alloy having at least 2% copper, an aluminum alloy having at least 2% silicon, and an aluminum alloy having at least 2% tungsten; and the second layer comprises of a material selected from the group consisting of: aluminum, aluminum-copper alloys, and aluminum-titanium alloys.

[c3] 3. The method of claim 1, wherein the Young"s Modulous of Elasticity of the second layer is less than about 90 GPa, and the Young"s Modulous of Elasticity of the first layer is at least about 100 GPa or greater.

[c4] 4. The method of claim 1, wherein the first layer of the bond pad is more resistant to penetration by a probe tip during probe testing than the second layer of the bond pad.

[c5] 5. The method of claim 1, wherein the first layer of the bond pad is more resistant to mechanical failure than the second layer of the bond pad during mechanical testing of a wirebond interconnection formed on the bond pad.

[c6] 6. The method of claim 1, further comprising:
forming a wirebond interconnection on the bond pad.

[c7] 7. A method of forming a bond pad for use in a wire-bond interconnection, comprising:
depositing a first layer of bond pad material on a sub-strate; and
depositing a second layer of bond pad material on the first layer, wherein a hardness of the first layer is greater than a hardness of the second layer.

[c8] 8.The method of claim 7, wherein the hardness of the first layer is about 0.8 and the hardness of the second layer is about 0.6.

[c9] 9. The method of claim 7, wherein the first layer com-prises a material selected from the group consisting of: $TiAl_x$, an aluminum alloy having at least 2% titanium, an

aluminum alloy having at least 2% copper, an aluminum alloy having at least 2% silicon, and an aluminum alloy having at least 2% tungsten; and the second layer comprises of a material selected from the group consisting of: aluminum, aluminum-copper alloys, and aluminum-titanium alloys.

[c10] 10. The method of claim 7, wherein the first layer of the bond pad is more resistant to penetration by a probe tip during probe testing than the second layer of the bond pad.

[c11] 11. The method of claim 7, wherein the first layer of the bond pad is more resistant to mechanical failure than the second layer of the bond pad during mechanical testing of a wirebond interconnection formed on the bond pad.

[c12] 12. The method of claim 7, further comprising:
forming a wirebond interconnection on the bond pad.

[c13] 13. A semiconductor device, comprising:
a first layer formed on a substrate; and
a second layer on the first layer, wherein the first layer of the bond pad has a higher Young"s Modulous of Elasticity than the second layer.

[c14] 14. The semiconductor device of claim 13, wherein the first layer comprises a material selected from the group

consisting of: $TiAl_x$, an aluminum alloy having at least 2% titanium, an aluminum alloy having at least 2% copper, an aluminum alloy having at least 2% silicon, and an aluminum alloy having at least 2% tungsten; and the second layer comprises of a material selected from the group consisting of: aluminum, aluminum-copper alloys, and aluminum-titanium alloys.

[c15] 15. The semiconductor device of claim 13, wherein the first layer of the bond pad is more resistant to mechanical failure than the second layer of the bond pad during mechanical testing of a wirebond interconnection formed on the bond pad.

[c16] 16. The semiconductor device of claim 13, wherein the first layer of the bond pad is more resistant to penetration by a probe tip during probe testing than the second layer of the bond pad.

[c17] 17. The semiconductor device of claim 13, wherein the Young"s Modulous of Elasticity of the second layer is less than about 90 GPa, and the Young"s Modulous of Elasticity of the first layer is at least about 100 GPa or greater.

[c18] 18. The semiconductor device of claim 13, wherein the hardness of the first layer is about 0.8 and the hardness

of the second layer is about 0.6.

[c19] 19. The semiconductor device of claim 13, further comprising:
an oxide layer over a surface of the substrate; and
a via formed within the oxide layer within which the first and second layers of the bond pad are formed.

[c20] 20. The semiconductor device of claim 13, wherein a wirebond interconnection is formed in electrical connection with the bond pad.